

**THE INSTITUTE OF MATHEMATICS AND ITS
APPLICATIONS**

IMANA NEWSLETTER

**Newsletter of the Numerical Analysis Group of the
Institute of Mathematics and its Applications**

**Volume 31 Number 3
April 2007**

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1 Questionnaire feedback

Many thanks to everyone who filled in the questionnaire or sent me their comments on the Newsletter. I have had feedback from about 60 readers. Most indicated that they found much of the Newsletter of interest, with the lists of technical reports and conferences rated particularly highly. As I anticipated, the list of email addresses does not appear to be very useful so I do not plan at present to maintain this. The information on the postgraduate courses was also not so popular but, reading between the lines, I think that this may have been because a disproportionate number of replies came from more elderly and retired members. These members indicated that they value the Newsletter as a means of keeping in touch with what is going on in the community.

A number of respondents commented that they would like to see more general articles in the Newsletter. I am open to suggestions here and would welcome contributions. In this issue, I am starting a series of articles to introduce the members, interests and activities of NA groups in the UK. We are beginning with two of the largest groups: Oxford and Strathclyde (with thanks to Nick Trefethen and Mark Ainsworth). I hope that in forthcoming issues, others will volunteer to write articles on their group (next issue: Manchester).

Of course, the Newsletter can only be useful if the community supports it by contributing on a regular basis. I would really encourage you to pass on details of your group's relevant activities (including technical reports, seminars, visitors, vacancies, graduate courses etc). Please nominate an appropriate person in your group to take on this task (perhaps an enthusiastic postgraduate student or an admin. assistant?). It only has to be done three times a year and takes just minutes to do. If you could pass contact details on to me, I send out an email reminder to contributors about two weeks before each copy date. Contributions from individuals are also very welcome.

Finally, it is not too late to either fill in the questionnaire (available on the IMA website at www.ima.org.uk/learned_soc/interestgroups.htm) or to send me your comments on the Newsletter. I would like to urge more of you who have not already indicated their preference to switch to receiving the Newsletter electronically. You can either receive an email with the pdf attachment or an email letting you know when a Newsletter is ready to download from the web. Encourage your students and colleagues also to sign up (membership of IMA is not required).

The copy date for the next Newsletter will be **Friday 14th September**.

Jennifer Scott
Group Leader, Numerical Analysis Group
Rutherford Appleton Laboratory.
j.a.scott@rl.ac.uk

2 Meet the Numerical Analysis Group ... Strathclyde

Currently comprising of nine permanent academic staff, the numerical analysis group at Strathclyde University is one of the largest and most diverse in the United Kingdom. The group is presently led by **Mark Ainsworth** whose research is in the analysis adaptive finite element approximation of partial differential equations. Most recently, Mark has collaborated with Prof. Ken Morgan (Civil Engineering, Swansea) and BAE Systems in Bristol on computational electromagnetics, and Prof. Nenad Bicanic (Civil Engineering, Glasgow) on multiscale modelling of masonry structures.

Penny Davies is currently working on the use of discontinuous Galerkin methods for the approximation of integro-differential equations in collaboration with Prof. Hermann Brunner (St Johns) and Prof. Dugald Duncan (Heriot-Watt). Professor Brunner holds a visiting professorship within the department and is a frequent visitor to the department. Penny is also heavily involved with mathematics outwith the university and sits on a number of LMS committees.

Oleg Davydov joined the department in 2005 as lecturer and was promoted to a Readership the following year. Oleg brings a new dimension to the group in the area of approximation theory. He has published extensively in the areas of multivariate splines, radial basis functions and wavelets, and is collaborating with leading international figures in the field including Prof. Larry Schumaker (Vanderbilt). Oleg's skills

are not limited to theory and he is the co-author of TSFit, a library of C++ routines for scattered data fitting, that can be downloaded from his web page.

Des Higham's current research activity is in the area of computational graph theory matrix computations for clustering and ordering large datasets and for understanding connectivity structures. These techniques are being applied to network systems in bioinformatics in collaboration with Prof. Alistair Spence (Bath), Prof. Peter Grindrod (Reading) and researchers at the Beatson Institute for Cancer Research in Glasgow. Des also maintains an interest in the numerical solution of stochastic differential equations.

Roland Hunt is now the longest standing member of the numerical analysis group. Roland has extensive experience in the numerical solution of industrial problems and most recently has been involved in the analysis of fluid problems in spin coating, windscreen sagging and wet steam flow. Roland collaborates with experts in asymptotics of thin film flows within the department where his skills in carrying out high accuracy numerical simulations has revealed hitherto unsuspected scaling laws that were subsequently verified through asymptotic analysis.

Philip Knight's background is in numerical linear algebra which he is currently applying to analyse algorithms used by Google and other search engines. This involves modelling internet surfing as a random walk and looking at the statistics of the resulting stochastic process, and ordering pages according to the size of the components in the stationary distribution of the connectivity matrix. Philip is collaborating with researchers at CERFACS in Toulouse including Prof. Iain Duff, who also holds a visiting professorship within the department.

John Mackenzie's research lies in the area of adaptive numerical solution of differential equations using moving meshes which he has successfully applied to a host of application areas including hyperbolic PDES, problems involving change of phase, singularly perturbed boundary value problems and, in collaboration with engineers at Strathclyde, industrial problems in convective heat transfer. John is currently co-organiser of the Scottish Computational Mathematics Symposium, a series of annual meetings initiated by Emeritus Prof. David Sloan, jointly with Prof. Dugald Duncan.

Alison Ramage, recently promoted to a Readership, primary area of research is in the iterative solution of large sparse systems arising in finite element discretisation. Alison is now developing an interest in the numerical analysis of PDEs arising in liquid crystal devices in which she is now collaborating with members of the liquid crystal group within the department and researchers at Hewlett Packard Research Laboratories in Bristol. Alison was recently elected to SIAM Council.

The most recent appointment to the group is **Gabriel Barrenechea** who was previously with the University of Concepción in Chile. Gabriel brings new expertise in the application and analysis of novel finite element methods along with the numerical solution of challenging problems in fluid flow and multiscale phenomena.

The group runs a regular seminar series involving both internal and external speakers covering a wide range of topics. Looking to the future, the group will organise the Biennial Numerical Analysis Conference in 2009, and is relishing the challenge of continuing the wonderful tradition set by Dundee.

Mark Ainsworth (M.Ainsworth@strath.ac.uk)

3 Meet the Numerical Analysis Group ... Oxford

The Numerical Analysis Group at Oxford has been around for a long time, and many of those reading this newsletter are among its alumni. It was founded in the 1960s by Leslie Fox in an era when computing was very much in the hands of the numerical analysts. Indeed, there was a time when anyone at Oxford who wanted to use the computer had to get permission from Professor Fox!

Worldwide, numerical analysts took the lead in founding computer science departments, and this was certainly true at Oxford, where it was Professor Fox and others who created the Computing Laboratory. Just as at Stanford and Cornell and many other places, this grew into a multidisciplinary department in which Numerical Analysis was a smaller fraction. Nonetheless, Oxford NA has remained sizeable and influential and has always contained about half a dozen academics and a regular stream of DPhil students, visitors, and postdoctoral researchers, as well as students connected with the longstanding MSc

in Mathematical Modelling and Scientific Computing run jointly with OCIAM, the Oxford Centre for Industrial and Applied Mathematics.

Today the NA Group has seven permanent academics. With world-leading representatives in all the “big three” areas of numerical linear algebra (NLA), partial differential equations (PDE), and optimization, we are proud of our breadth:

- Mike Giles (CFD, finance, HPC)
- Nick Gould (optimization, NLA, HPC)
- Raphael Hauser (optimization, applied probability)
- Ian Sobey (CFD)
- Endre Suli (PDE)
- Nick Trefethen (NLA, PDE)
- Andy Wathen (NLA, PDE)

In this list, HPC as usual stands for high-performance computing. Mike Giles was one of the founders of the Oxford Supercomputing Centre, now a part of the new Oxford e-Research Centre in the new building that has just opened next to us. We are involved in applications, especially in the areas of finance, materials, fluid mechanics, and biology.

The Oxford NA Group has produced an extraordinary collection of textbooks – see <http://www.comlab.ox.ac.uk/oucl/research/na>. We are also very heavily involved as editors of many of the the leading journals of our field, including as editors-in-chief of IMAJNA (Suli) and the SIAM Journal on Optimization (Gould).

Like so many universities, Oxford has become much more international. Our DPhil students come from across the world, and especially from many European countries. We have 15 or so DPhil students at any time, housed in comfortable offices next to the academics, with many group activities and a good spirit. Having a famous brand name is nice, but it also brings a problem: there are always highly-qualified potential students who don’t think of applying to Oxford since they have some notion it is a place just for geniuses or snobs. This is nonsense, and if you are one of these people, please apply!

A big change is coming for us. In around 2011, a new Mathematics Centre will appear in Oxford, replacing the current small building on St Giles’ and, for the first time, Oxford Mathematics will have a proper departmental centre. With some sadness, but also with excitement about the future, the Oxford NA Group has decided to change departments at that time and become part of Mathematics.

Nick Trefethen (LNT@comlab.ox.ac.uk)

4 Who’s Visiting Whom

Allison Heard (University of Auckland). BATH (Host: Adrian Hill email: A.T.Hill@bath.ac.uk) Mid June 2007.

Research interests : Numerical solution of ordinary differential equations.

<http://www.math.auckland.ac.nz/heard/>

Francisco-Javier Sayas (University of Zaragoza, Spain). BRUNEL (Host: Norbert Heuer email: norbert.heuer@brunel.ac.uk) April 8-14.

Research interests : Numerical analysis of partial differential and boundary integral equations.

Dr Alf Gerisch (Martin-Luther-Universitt Halle-Wittenberg). DUNDEE (Host: Dr D F Griffiths email: dfg@maths.dundee.ac.uk)

Research interests : Numerical solution of PDEs; Mathematical Biology.

Visitors to OXFORD

- Professor Gene Golub (Stanford) (Host: Dr A Wathen email: andy.wathen@comlab.ox.ac.uk). 8 April for 3-6 months.
- Professor Gil Strang (MIT) (Host: Professor L N Trefethen email: Nick.Trefethen@comlab.ox.ac.uk). May.
- Professor Richard Brent (ANU) April 1-11.
- Professor Shiu-Hong Lui, (Univ of Manitoba) May 17-18.

- Professor Ian Sloan (University of New South Wales) June 11-15.
- Professor Jean-Berrut (University of Fribourg) June 18-22.

5 Technical Reports

University of Bath

- 16/06 Optimal panel-clustering in the presence of anisotropic mesh refinement.
Ivan G. Graham, Lars Grasedyck, Wolfgang Hackbusch and Stefan A. Sauter.
- 15/06 On Models of Dispersion at Macroscopic Scales. Peter Grindrod
- 14/06 Robust Domain Decomposition Algorithms for Multiscale PDEs.
I.G. Graham and R. Scheichl.
- 13/06 A mechanical realisation of a symplectic numerical method with large step-size.
Chris Budd, Steven Green and Giles Hunt.
- 12/06 Systems biology: unravelling complex networks.
Peter Grindrod, Des Higham, Keith Vass and Alastair Spence
- 11/06 Domain Decomposition for Multiscale PDEs.
I.G. Graham, P. Lechner and R. Scheichl.
- 10/06 Exponential estimates in averaging and homogenisation. Karsten Matthies.
- 9/06 Additive Schwarz and Aggregation-Based Coarsening for Elliptic Problems with Highly Variable Coefficients. R. Scheichl and E. Vainikko.
- 8/06 An Investigation of the Validity of Topology Optimisation Methods.
C. S. Edwards, H. Kim and C. J. Budd.
- 7/06 Regularity properties, representation of solutions and spectral asymptotics of systems with multiplicities Ilia Kamotski and Michael Ruzhansky.
- 6/06 On Budaev and Bogys approach to diffraction by the 2D traction free elastic wedge
V. Kamotski, L. Ju. Fradkin, B. A. Samokish, V. A. Borovikov and V. M. Babich.
- 5/06 On Landau theory and symmetric energy landscapes for phase transitions
Kai Hormann and Johannes Zimmer.
- 4/06 Jog my shape memorydynamics as a challenge in mathematical materials science
Johannes Zimmer.
- 3/06 Localised modes due to defects in high contrast periodic media via homogenization
Ilia V. Kamotski and Valery P. Smyshlyaev.
- 2/06 Exponential homogenization of linear second order elliptic problems with periodic coefficients
Vladimir Kamotski, Karsten Matthies and Valery Smyshlyaev.
- 1/06 A hybrid numerical-asymptotic boundary integral method for high-frequency acoustic scattering
V. Dominguez, I. G. Graham and V. P. Smyshlyaev.

BICS reports Available from <http://www.bath.ac.uk/math-sci/bics/preprints/>

1/06 UK Bioinformatics for functional genomics: watching the detectives.
Peter Grindrod.

Brunel University

http://people.brunel.ac.uk/~icsrsss/bicom/tech_rep.html

BICOM 07/1 A priori and a posteriori error analysis of an augmented mixed finite element method for incompressible elasticity. Leonardo Figueroa, Gabriel N. Gatica, Norbert Heuer.

BICOM 07/2 The boundary element method with Lagrangian multiplier.
Gabriel N. Gatica, Martin Healey, Norbert Heuer.

University of Cambridge

Reports available from <http://www.damtp.cam.ac.uk/user/na/reports.html>

NA2007/01 From high oscillation to rapid approximation III: Multivariate expansions.
Arieh Iserles and Syvert Nørsett.

University of Liverpool

Reports available from http://www.liv.ac.uk/~cmchenke/chen_pub.html

07/01 Efficient parallelization of the iterative solution of a coupled fluid-structure interaction problem. Martyn D Hughes and Ke Chen.

07/02 An accelerated algebraic multigrid algorithm for total-variation denoising.
Ke Chen and Joe Savage.

University of Manchester

MIMS EPrints from <http://www.manchester.ac.uk/mims/eprints>

2007.14: PIFISS Potential (Incompressible) Flow and Iterative Solution Software guide.
David J. Silvester and Catherine E. Powell.

University of Oxford

Reports available from <http://web.comlab.ox.ac.uk/oucl/publications/natr/index.html>

07/07 Preconditioning and convergence in the right norm. A Wathen.

07/06 A new approach to Yakubovich's s-Lemma. R Hauser.

07/05 A new perspective on the iteration complexity of interior point methods.
C Cartis, R Hauser.

07/04 Sparse finite element approximation of high-dimensional transport-dominated diffusion problems. C Schwab, E Suli, RA Todor.

07/03 Solving large-scale quadratic eigenvalue problems with Hamiltonian eigenstructure using a structure-preserving Krylov subspace method. P Benner, H Fabender, M Stoll.

07/02 How good are projection methods for convex feasibility problems? N I M Gould.

07/01 Finding a point in the relative interior of a polyhedron. C Cartis, N I M Gould.

Rutherford Appleton Laboratory

Reports available from <http://www.numerical.rl.ac.uk/reports/reports.html>

- RAL-TR-2007-001 Co-arrays in the next Fortran Standard. John Reid and Robert W. Numrich.
- RAL-TR-2007-002 Multigrid based preconditioners for the numerical solution of two-dimensional heterogeneous problems in geophysics.
I. S. Duff, S. Gratton, X. Pinel, and X. Vasseur.

6 Diary of Seminars

BATH : Seminars take place on Fridays at 12:15pm in Department of Mathematical Sciences, Building 1 West, Room 1W3.6. A timetable is available at <http://www.maths.bath.ac.uk/~jvl20/na-seminars>

BATH BICS series: Seminars take place at 1:15pm in Department of Mathematical Sciences, Building 1 West, Room 1W3.6. A timetable is available at <http://www.bath.ac.uk/math-sci/bics/seminars/index.html>

MANCHESTER : Numerical Analysis and Scientific Computing Seminars 2006/07 The seminars are held in the MSS building room M12 at 3pm. For more details and abstracts, see <http://www.mims.manchester.ac.uk/events/seminars/numerical-analysis.php>

OXFORD : Seminars take place on Thursdays at 2pm in the Lecture Theatre of Oxford University Computing Laboratory, Wolfson Building, Parks Road. A timetable and abstracts are available from <http://web.comlab.ox.ac.uk/oucl/news/>

RAL : Seminars are held in the Atlas Centre, Rutherford Appleton Laboratory and start at 2:15pm. Contact: s.dollar@rl.ac.uk

READING : Seminars take place on Fridays promptly at 3pm in room 113 of the Mathematics Department. Contact: s.davis@reading.ac.uk

APRIL 2007

- April 16 : BATH BICS. Nick McCullen (Bath). Complex Dynamics in Coupled Oscillators.
- April 19 : OXFORD. Dr Carl Seger (Intel and Oxford) Micro-processor design: Theoretical physics meets high-volume manufacturing.
- April 20 : BATH. Adrian Hill (Bath). Stability results for discrete time-varying systems.
- April 20 : MANCHESTER. Natalia Petrovskay (Birmingham). Title to be confirmed.
- April 23 : BATH BICS. Daniel Pagano (Bristol). Boundary Equilibrium Bifurcations in PWS Discontinuous Systems.
- April 25 : BATH. Sven Hammarling (NAG). Recent Advances in LAPACK and ScaLAPACK.
- April 26 : RUTHERFORD. Scott MacLachlan (Delft University of Technology). Multigrid solvers for quantum dynamics - a first look.
- April 27 : BATH. Sean Rigby (Department of Chemical Engineering, Bath). Title to be confirmed.
- April 27 : READING. Natasha Sofroniou (Reading). Route to chaos: periodic, quasiperiodic and chaotic behaviour of a driven system.
- April 30 : BATH BICS. Alexander Movchan (Liverpool). Mathematical model of a fault propagating in an inhomogeneous lattice.

MAY 2007

- May 3 : OXFORD. Gene Golub (Stanford). Title to be confirmed.
- May 4 : READING. Gene Golub (Stanford). Inner/outer iterations for solving linear systems of equations.
- May 4 : BATH. Richard Norton (Bath). Title to be confirmed.
- May 4 : MANCHESTER. Len Freeman (Manchester). Title to be confirmed.
- May 10 : OXFORD. Enrique Zuazua (University of Aut. Madrid). Title to be confirmed.
- May 10 : READING. Roger Grimshaw (Loughborough). Solitary waves in variable media.
- May 11 : BATH. Jennifer Scott (Rutherford). An introduction to HSL and the solution of sparse linear systems.
- May 14 : BATH BICS. Mike Carley (Department of Mechanical Engineering, Bath) Prediction of vortex flows using a least-squares Lagrangian method.
- May 14 : BATH BICS. Larissa Fradkin (South Bank). Diffraction by surface-breaking cracks: semi-analytical codes and their validation.
- May 17 : OXFORD. Shiu-hong Lui (University of Manitoba). Title to be confirmed.
- May 18 : READING. Mark Preston (Reading). A boundary integral equation method for a boundary value problem arising in water wave problems.
- May 24 : OXFORD. Gil Strang (MIT). Teaching computational science and engineering.
- May 25 : READING. William Parnell (Manchester). Effective behaviour of thermoelastic and prestressed composite media.
- May 31 : RUTHERFORD. Ekaterina Kostina (Heidelberg). Model based design of optimal experiments for dynamic processes.

JUNE 2007

- June 1 : BATH. Laura Hewitt (Bath). Title to be confirmed.
- June 4 : BATH BICS. Yan Fyodorov (Nottingham) Counting stationary points of random landscapes as a random matrix problem.
- June 7 : OXFORD. Uri Ascher (British Columbia) Artificial time integration.
- June 8 : BATH. Sebastien Guenneau (Liverpool). Title to be confirmed.
- June 11 : BATH BICS. Malwina Luczak (LSE). Title to be confirmed.
- June 14 : OXFORD. Tom Hou (Caltech). Dynamic depletion of vortex stretching and nonlinear stability of 3D incompressible flows.
- June 22 : BATH. Allison Heard (Auckland). Title to be confirmed.
- June 22 : OXFORD. Thirteenth Leslie Fox Prize meeting. See Highlighted Conferences.

7 Forthcoming Meetings and Conferences

APRIL 2007

31st South African Symposium on Numerical and Applied Mathematics (SANUM 2007), April 2-4

University of Stellenbosch, South Africa. <http://dip.sun.ac.za/sanum>

Workshop on Advances in Optimization, April 19-21.

Tokyo Institute of Technology, Tokyo, Japan.

<http://www.cas.mcmaster.ca/~deza/tokyo2007.html>

International Symposium on Health Informatics and Bioinformatics (HIBIT'07), April 30 - May 2

Belek, Antalya, Turkey <http://hibit.ii.metu.edu.tr/07/index.html>

MAY 2007

BETA 2007: Boundary Elements - Theory and Applications Beta. May 22-24.

Hannover, Germany. <http://www.ifam.uni-hannover.de/beta2007/>

Fifth International Workshop on Computer Algebra Systems and Their Applications, CASA'2007, May 27-30

Graduate University of Chinese Academy of Sciences, Beijing, China.

<http://personales.unican.es/iglesias/CASA2007/>

International Conference on Computational Science, ICCS 2007, May 27-30

Beijing, China. <http://www.iccs-meeting.org/iccs2007>

SIAM Conference on Applications of Dynamical Systems (DS07),

May 28 - June 1

Snowbird, Utah. <http://www.siam.org/meetings/ds07/>

12th International Conference on Mathematical Modelling and Analysis,

May 30 - June 2

Trakai, Lithuania. <http://www.vtu.lt/rc/mma2007>

JUNE 2007

Applications of Mathematics in Engineering and Economics (AMEE'07),

June 8-14

Technical University of Sofia, Bulgaria. <http://www.tu-sofia.bg/fpmi/amee>

BICS Workshop Multi-resolution and High Oscillation for Evolutionary Problems,

June 11-12

University of Bath. <http://www.bath.ac.uk/math-sci/BICS/multi-res/>

Fourth International Conference on Computation and complexity in analysis, June 16-18

Siena, Italy. <http://cca-net.de/cca2007/>

7th International Conference on Computational and Mathematical methods in science and engineering, CMMSE2007, June 20-23

Illinois Institute of Technology, Chicago. <http://www.uwm.edu/Dept/CIM/CMMSE/>

Workshop on Eigenvalue Problems, Software and Applications (EPSA2007),

June 27-29

Faculty of Sciences, University of Porto, Portugal. <http://www.fep.up.pt/epsa2007>

3rd International Conference Computational Methods in Applied Mathematics: CMAM-3,

June 25-30

Minsk, BELARUS <http://www.cmam.info/conferences>

22nd Biennial Conference on Numerical Analysis, June 26-29

University of Dundee, Scotland. <http://www.maths.dundee.ac.uk/naconf/index.shtml>

SIAM Conference on Control and Its Applications, June 29 - July 1

San Francisco, California. <http://www.siam.org/meetings/ct07/>

JULY 2007**EUROPT-OMS Conference on Optimization, July 4-7**

Prague, Czech Republic. <http://cio.umh.es/europt-oms/>

EURO-CBBM Workshop Workshop on OR in Computational Biology, Bioinformatics and Medicine, July 8

Prague, Czech Republic. <http://euro-cbbm.ku.edu.tr/>

22nd European Conference on Operational Research (EURO XXII), July 8-11

Prague, Czech Republic. <http://euro2007.vse.cz>

von Neumann Symposium on Sparse Representation and High-Dimensional Geometry, July 8-12

Snowbird, Utah. <http://www.ams.org/meetings/vonneumann07.html>

International Conference on Preconditioning Techniques for Large Sparse Matrix Problems, July 9-12

Toulouse, France. <http://www.precond07.enseiht.fr>

International Conference on SCientific Computation And Differential Equations SciCADE'07, July 9-13

Saint-Malo, France. <http://scicade07.irisa.fr/>

Second International Conference on Approximation Methods and Numerical Modeling in Environment and Natural Resources, MAMERN'07, July 11-13

Granada, Spain. <http://www.ugr.es/~mamern07/home.htm/>

6th International Congress on Industrial and Applied Mathematics, ICIAM 2007, July 16-20

Zurich, Switzerland. <http://www.iciam07.ch/index>

OPTIMIZATION 2007, July 22-25

Porto, Portugal. <http://www.fep.up.pt/opti2007>

Computational Methods in Finance, July 26-27

University of Waterloo, Canada. http://www.iqfi.uwaterloo.ca/call_for_papers.shtml

International Symposium on Symbolic and Algebraic Computation (ISSAC), July 29 - August 1

Waterloo, Canada. <http://www.cs.uwaterloo.ca/issac2007/>

AUGUST 2007**Second Mathematical Programming Society International Conference on Continuous Optimization, August 12-16**

McMaster University, Hamilton, Ontario, Canada. <http://iccopt-mopta.mcmaster.ca/>

Computational Methods with Applications, August 19-25

Harrachov, Czech Republic. <http://www.cs.cas.cz/~harrachov>

Euro-Par 2007, August 28-31

IRISA, Rennes, France. <http://europar2007.irisa.fr>

International Workshop on Multicore and Hybrid Systems for Numerically Intensive Computations (MHSN2007), August 28-31

Niagara Falls, Ontario, Canada. <http://www.cs.utk.edu/~luszczek/plasma/mhsn2007.html>

SEPTEMBER 2007**Workshop on Numerical Analysis of Stochastic PDEs, September 3-4**

The University of Manchester. <http://www.ma.man.ac.uk/~shardlow/naspde.html>

BICS conference on numerical analysis: multiscale methods, adaptivity and complexity, September 4-7

University of Bath. <http://www.bath.ac.uk/math-sci/BICS/nammac/>

Conference in Numerical Analysis 2007 (NumAn 2007), September 3-7

Kalamata, Greece. <http://www.math.upatras.gr/numan2007/>

Seventh International Conference on Parallel Processing and Applied Mathematics (PPAM 2007), September 9-12

Gdansk, Poland. <http://ppam.pcz.pl>

3rd Workshop on Large Scale Computations on Grids, September 9-12

Gdansk, Poland. <http://lascog07.info.uvt.ro/>

IMA Conference on Numerical Linear Algebra and Optimisation, September 13-15

University of Birmingham. <http://www.ima.org.uk/Conferences/confdiary.htm>

International Conference of Numerical Analysis and Applied Mathematics 2007 (ICNAAM 2007), September 16-20

Corfu, Greece. <http://www.icnaam.org/>

6th UK Conference on Boundary Integral Methods, September 17-18

Durham, UK. <http://www.durham.ac.uk/engineering/ukbim6>

Fourth International Workshop on Meshfree Methods for Partial Differential Equations, September 17-20

Bonn, Germany. <http://wissrech.ins.uni-bonn.de/meshfree>

13th Czech-French-German Conference on Optimization, September 17-21

Heidelberg, Germany. <http://cfg07.uni-hd.de>

Approximate GCD Computations and New Methods for Solving Polynomial Equations of High Degree with Multiple Roots, September 17-21

Oxford University Computing Laboratory. http://www.dcs.shef.ac.uk/ml/summer_school/

The 8th Hellenic European Research on Computer Mathematics and its Applications, September 20-22

Athens University of Economics and Business. <http://www.aueb.gr/conferences/hercma2007/>

20th Chemnitz FEM Symposium, September 24-26

Chemnitz, Germany. <http://www.tu-chemnitz.de/mathematik/fem-symposium/>

OCTOBER 2007**SIAM Conference on Mathematics for Industry: Challenges and Frontiers, October 9-11**

Philadelphia, Pennsylvania. <http://www.siam.org/meetings/mi07/>

CERFACS Anniversary Meeting, October 11-12 Toulouse, France.

Workshop on Computer Aspects of Numerical Algorithms (CANA'07), October 15-17 Wisla, Poland. <http://www.cana.imcsit.org>

Workshop on Optimization in Finance, October 26-27
Coimbra, Portugal. <http://www.mat.uc.pt/tt2005/follow-up>

NOVEMBER 2007

SC07: 20th International Conference for High-Performance Computing, Networking, Storage and Analysis, November 12-16
Reno, Nevada. <http://sc07.supercomputing.org>

DECEMBER 2007

SIAM Conference on Analysis of Partial Differential Equations (PD07), December 10-12
Hilton Phoenix East/Mesa, Mesa, Arizona. <http://www.siam.org/meetings/pd07>

Nonconvex Programming: Local and Global Approaches (NCP07), December 17-21
National Institute for Applied Sciences, Rouen, France. <http://ncp07.insa-rouen.fr/>

8 Highlighted Conferences

**BICS Workshop
Multi-resolution and High Oscillation for Evolutionary Problems:
Blow-up and Hamiltonian Systems
University of Bath, 11-12 June 2007**

As part of the Isaac Newton Institute six month programme on numerical methods for highly oscillatory problems, we shall be holding a short satellite meeting which will focus on the evolutionary problems related to multi-resolution and high oscillation. In particular we will look at problems in blow-up, oscillatory Hamiltonian systems and nonlinear optics.

Invited speakers:

- Uri Ascher, University of British Columbia
- Victor Galaktionov, University of Bath
- Steven Green, University of Bath
- Ernst Hairer, University of Geneva
- David Lloyd, University of Surrey
- Gabriel Lord, Heriot-Watt
- Robert McLachlan, Massey University
- Mark Peletier, Eindhoven
- Reinhout Quispel, La Trobe University
- Vivi Rottschfer, University of Leiden
- Nick Trefethen, Oxford University Computing Laboratory

Scientific Enquiries: Chris Budd (C.J.Budd@bath.ac.uk) or Ivan Graham (I.G.Graham@bath.ac.uk)

Administrative Enquiries: bics@maths.bath.ac.uk

More information and registration <http://www.bath.ac.uk/math-sci/bics/multi-res/>

13th Leslie Fox Prize Competition
Friday, 22 June 2007,
Oxford University Computing Laboratory.

Each of the seven finalists will present a 40-minute lecture at this one-day numerical analysis symposium. The finalists are:

- Timo Betcke (University of Manchester)
A GSVD formulation of a domain decomposition method for planar eigenvalue problems.
- Laurent Demanet (Stanford University)
Wave atoms and time upscaling of wave equations.
- Ioana Dumitriu (University of Washington)
Toward accurate polynomial evaluation in rounded arithmetic.
- Daniel Kressner (University of Zagreb and Umea University)
The effect of aggressive early deflation on the convergence of the QR algorithm.
- Emre Mengi (University of California at San Diego)
On the estimation of the distance to uncontrollability for higher-order systems.
- Yoichiro Mori (University of British Columbia)
Convergence proof of a Stokes flow immersed boundary method.
- Sheehan Olver (University of Cambridge)
Numerical approximation of highly oscillatory integrals.

Further details available at: <http://users.comlab.ox.ac.uk/andre.suli/fox/>

22nd Biennial Conference on Numerical Analysis
University of Dundee
26–29 June, 2007

The special invited lecture in honour of A. R. Mitchell will be presented by Professor Roger Fletcher FRS, University of Dundee.

The other Principal Speakers will include

- Douglas Arnold, University of Minnesota
- Dugald Duncan, Heriot-Watt University
- Bengt Fornberg, University of Colorado
- Gene Golub, Stanford University
- Paul Houston, University of Nottingham
- Angela Kunoth, Universitat Bonn
- Jeremy Levesley, University of Leicester
- Sven Leyffer, Argonne National Laboratory
- Volker Mehrmann, Technische Universitat Berlin
- David Silvester, University of Manchester
- Zdenek Strakos, Academy of Sciences of the Czech Republic
- Denis Talay, INRIA

The after-dinner speaker will be Professor L. N. Trefethen FRS, Oxford University.

Further information is available at the conference web site: <http://www.maths.dundee.ac.uk/naconf/> which allows online registration.

We are offering, through SIAM, two student prizes of 50GBP each for the best presentations. See http://www.personal.rdg.ac.uk/~sms03sl/UKIESIAM/student_prize.pdf for detailed guidelines.

David Griffiths / Alistair Watson (dfg@maths.dundee.ac.uk)

Numerical Analysis: Multiscale methods, adaptivity and complexity
Bath Institute for Complex Systems,
University of Bath, 4–7 September 2007

The themes of this conference will be: numerical analysis for multiscale problems, stochastic and high-dimensional problems, adaptive methods, inverse problems and applications, numerical methods for wave propagation problems.

Invited speakers include:

H. Ammari (Ecole Polytechnique, Paris), D. Bird (Bath), M. Burger (Muenster), S.N. Chandler-Wilde (Reading), M. Cullen (U.K. Met Office), W. Dahmen (Aachen), C. M. Elliott (Sussex), T.-Y. Hou (Caltech), W. Huang (Kansas), P.K. Jimack (Leeds), I.G. Kevrekidis (Princeton), M. Kirkilionis (Warwick), C. Mitchell (Bath), R. Potthast (Reading), C. Reisinger (Oxford), C. Schwab (ETH, Zuerich), V. P. Smyshlyaev (Bath), I.H. Sloan (New South Wales), E. Suli (Oxford), R. Tempone (Florida State).

Thanks to a grant from the London Mathematical Society, the conference will financially support a limited number of research students who wish to give talks. Students and other delegates who wish to propose contributed talks should register and send their abstracts by 23rd April. The conference will not contain parallel sessions, so the total number of contributed talks is limited. Registration is now open at the conference web page: <http://www.bath.ac.uk/math-sci/BICS/nammac/>

Conference Scientific Enquiries: I.G. Graham (I.G.Graham@bath.ac.uk) or R.Scheichl (R.Scheichl@bath.ac.uk)

Administrative Enquiries: bics@maths.bath.ac.uk

9 Summer Schools

Parallel Programming Summer School, Manchester, England, August 2007

Manchester Computing, at the University of Manchester, are pleased to announce the 2007 Parallel Programming Summer School. There will be two parallel sessions. Attendees without knowledge of Fortran or C will study:

- Fortran
- Introduction to HPC
- OpenMP
- Introduction to MPI

Experienced programmers will study:

- Introduction to HPC
- OpenMP
- Introduction to MPI
- Advanced MPI
- Code Optimization

There will also be guest lectures on broader topics in HPC. Speakers include Jack Dongarra and vendor experts.

Fees, Accommodation and Meals: We can provide student accommodation with private bathroom, and all meals. Registration and all other fees are a maximum of 399.50 for UK academic institutions. Places are limited.

For further details and registration see: <http://www.mc.manchester.ac.uk/services/courses/summerschool>

Summer School, Oxford: 17-21 September 2007
New methods for solving polynomial equations and approximate GCD computations
http://www.dcs.shef.ac.uk/ml/summer_school
Registration now open: early registration discount
EPSRC studentships available

The Summer School will consist of lectures and laboratory classes on robust methods for solving polynomial equations of high degree that contain multiple roots. The lectures will include the following topics:

- Reasons for the failure of traditional methods to compute multiple roots of polynomials
- Structured and unstructured condition numbers of polynomials
- Resultant matrices and computational algebraic geometry
- Linear and non-linear structured matrix methods
- Non-linear least squares

Invited speakers:

- Rob Corless, University of Western Ontario, Canada
- Gershon Elber, The Technion, Haifa, Israel
- Gene Golub, Stanford University, USA
- Zhonggang Zeng, Northeastern Illinois University, USA

For more details contact: Joab Winkler, Department of Computer Science, The University of Sheffield.
(j.winkler@dcs.shef.ac.uk)

10 Theses

University of Liverpool : PhD Thesis

Joseph Savage.

Fast Iterative Methods for Solving Large Systems Arising from Variational Models in Image Processing.

University of Oxford : D.Phil. Theses

Christoph Ortner.

Numerical modelling of material failure.

Teik-Wynn Tee.

An adaptive rational spectral method for differential equations with rapidly varying solutions.

University of Reading : PhD Thesis

Jenny Morrell.

A cell by cell adaptive mesh arbitrary Lagrangian Eulerian hydrocode for the numerical solution of the Euler equations.

11 Recent Appointments

Four New Chairs in Mathematics at Reading

Four professors have recently been appointed to Mathematics at Reading, to develop new activity in theoretical polymer physics and dynamics of complex fluids and in complex systems and systems biology, and to strengthen existing activity in applied analysis and computational modelling. The appointments are as follows:

- Professor Mark Matsen, transferring from Physics at Reading.
- Professor Peter Grindrod CBE, who joined us 1 March from Lawson Software.
- Professor Alexei Likhtman, joining us on 1 May from Leeds.
- Professor Yuri Kondratiev, joining us on 1 September from Bielefeld.

Bath: Nick McCullen started working as a postdoc of BICS in January 2007.

12 Vacant positions and studentships

University of Manchester: Lectureships

The School of Mathematics in The University of Manchester is advertising Lectureships in Pure Mathematics (Logic), Applied Mathematics, Probability and Statistics. Numerical analysis (part of Applied Mathematics at Manchester) is one of the areas in which an appointment can be made.

Details are at <http://www.maths.manchester.ac.uk/info/vacancies.html>

Closing date 30/04/2007.

University of Strathclyde: Post-graduate Studentship in Numerical Analysis of PDEs

Applications are invited for a fully funded post-graduate studentship in the numerical analysis of PDEs at the University of Strathclyde in Glasgow. You should have, or be expecting to complete, a degree in mathematics or related discipline.

Further details may be found at:

<http://www.maths.strath.ac.uk/vacancies/postgraduate/ma1>

while informal enquiries should be directed to Professor Mark Ainsworth (M.Ainsworth@strath.ac.uk).

INRIA/ENS Lyon, France

A two year post doctoral position is available in Lyon (France), to work on parallel sparse direct solvers.

More information can be found at http://graal.ens-lyon.fr/MUMPS/open_positions.html

Enquiries may be addressed to Jean-Yves L'Excellent (Jean-Yves.L.Excellent@ens-lyon.fr)

NAG: See section 14.

13 IMA Journal of Numerical Analysis

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F. Bornemann.

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Conservative upwind finite-element method for a simplified Keller-Segel system modelling chemotaxis. pp 332-365

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On computing eigenvalues of second-order linear pencils. pp 366-380

Ph. Chartier and A. Murua.

Preserving first integrals and volume forms of additively split systems. pp 381-405

R. Carter and M.B. Giles.

Sharp error estimates for discretisations of the 1D convection/diffusion equation with Dirac initial data. pp 406-424

For further details see: www.imanum.oupjournals.org

14 Software News

NAG

Academic researchers will shortly have access to HECToR, a new Research Councils UK High End Computing Service. EPSRC, acting as managing agent on behalf of all the UK REsearch Councils selected Cray Inc to provide the hardware, which will be accommodated and managed by UoE HPCX Ltd at the University of Edinburgh's Advanced Computing Facility. NAG have been chosen to provide computational science and engineering support for users of this machine (<http://www.hector.ac.uk>) The service is scheduled to start in October 2007, though preliminary work on the project will begin in April 2007.

Naturally, this will have a large impact upon NAG and, as well as drawing on existing staff already expert in SMP and Parallel computing, NAG is intending to employ extra skilled personnel. Please see <http://www.nag.co.uk/about/careers.asp> if you are interested in applying for such a post. It is hoped that this influx will give fresh impetus to all of our scientific work, including the continued development of modern algorithms and techniques for our libraries.

As readers of our regular electronic newsletter will know, we have released the Mark 21 implementation of our Fortran DLL library. This represents a significant improvement over the Mark 20 DLLs, both in terms of content and in terms of the underlying BLAS software on which it is based. Users are therefore encouraged to convert to Mark 21.

With more users wanting to use .NET and wanting the algorithmic power of the whole Mark 21 library, we have provided information on how the DLL might be called from C#. The electronic newsletter features this article. Users wishing to receive the newsletter may elect to do so from <http://www.nag.co.uk/NagNews/index.asp>.

David Sayers (David.Sayers@nag.ac.uk)

MATLAB[©] interfaces for selected HSL solvers

A number of users of the HSL library have solicited the introduction of MATLAB[©] interfaces to facilitate both their research and their teaching. We have initially selected two of the most widely used Fortran 77 HSL packages as prototypes for developing MATLAB[©] interfaces:

MA57 implements a multifrontal algorithm for the solution of one or more sparse symmetric systems $AX = B$. An LDL' factorization of A is computed, where the matrix L is a unit lower triangular matrix and D is a block diagonal matrix with blocks of order 1 or, if necessary, 2. To limit the fill-in during the factorization process the matrix A is reordered using either an Approximate Minimum Degree (AMD) algorithm or, if METIS software is available, a Nested Dissection algorithm. Before the factorization starts, scaling of the matrix A is performed using the HSL package MC64.

MA48 solves a sparse unsymmetric system $AX = B$ of m linear equations in n unknowns using Gaussian elimination. There are facilities for choosing a good pivot order, factorizing a matrix with a given pivot order, and solving a system of equations using the factorized matrix. Error estimates are available. The matrix A is permuted to Block Triangular Form (BTF) then, for each diagonal block A_i , an LU factorization of A_i is computed, where L is a unit lower triangular matrix and U is an upper triangular matrix.

The MATLAB[©] interfaces have been written in C. To date the installation has been tested under Linux and UNIX-Solaris; we do not yet have experience of installing under Windows or Mac. Documentation and further details are available at <http://www.cse.clrc.ac.uk/nag/hsl/hsl.shtml>
UK academics can freely download the interfaces and any HSL packages for research and teaching purposes.

Note that the MA57 interface optionally allows the factors L and D plus the permutation matrix P and the scaling matrix S computed by MC64 to be extracted in MATLAB[©] format. This requires more memory and may fail for very large matrices.

For both MA57 and MA48, the standard option will give the solution X and, if requested, statistics on the factorization time, fill-in, and estimates of both backward and forward errors. Moreover, the user is supplied with MATLAB[©] functions and with GNU[©] Makefiles that can be used to install the mex-files.

Any problems, bugs, or suggestions should be addressed to:
Mario Arioli (m.arioli@rl.ac.uk) at the Rutherford Appleton Laboratory.

15 Book Announcement

Off at a Tangent by John C. Mason

Emeritus Professor John Mason's personal memoirs of his life in Mathematics, Comedy and the Arts are to appear soon. This is numerical analysis without tears, and there are no equations or theorems!

Contents: The book is based on mathematics, comedy acting/writing, painting and other work of the author at ten locations in four countries, including DPhil (Oxon), DSc (Huddersfield), several BBC Radio writing commissions, satirical revues in the USA, Canada and UK, and umpteen after-dinner speeches. It includes:

- 12+ chapters and approximately 240 pages
- over 40 puzzles and solutions
- 60+ illustrations, including about 27 paintings and photos by the author
- 30 humorous songs/poems
- more than 13 after-dinner speeches

It also gives compact accounts of a 140-day round the world trip in 1970 and of several trips to Greece and to Australia and NZ.

Target audience: This book will suit a general, broad audience. It is easy to read and full of interesting features. It makes an excellent holiday read.

To order: To be published (ISBN 186218-071-70) by the University of Huddersfield, UK. If you wish to order a copy in the first print run, please contact John Mason (j.mason41@btinternet.com) by May 31. The price will depend on orders, but is expected to be about 19GBP (+P&P).

John Mason, University of Huddersfield, March 2007.

16 Postgraduate Courses

University of Bath

New MSc in Mathematical Biology

The MSc will combine taught core units in mathematics, biology and biochemistry with training in research methods and an individual project.

Students will be members of the Centre for Mathematical Biology, taught and supervised jointly by staff in the Department of Mathematical Sciences and the Department of Biology and Biochemistry. Both departments have strong research portfolios and have demonstrated excellence in teaching over many years.

The MSc is a one year full time programme. It can be used as the first year of an Integrated PhD or as a component of the Graduate School provision for PhD students in mathematical biology.

Fully funded studentships are available to suitably qualified individuals. These have been made available by the BBSRC and the University of Bath.

For details, see <http://www.bath.ac.uk/cmb/msc/>

MSc in Modern Application of Mathematics

Study full time for one year to obtain an MSc degree in Modern Applications of Mathematics at the Department of Mathematical Sciences, University of Bath. (RAE grade 5* for research, QAA grade 24/24 for teaching quality.) This programme is suitable for anyone interested in using mathematics in industry. There are EPSRC Studentships for highly qualified UK and EU applicants only. Applications from appropriately qualified overseas students are strongly encouraged. Financial support is available to pay tuition fees for selected EU applicants. Information on scholarships for study in the UK is available from British Council Scholars. Information on potential funding for students from commonwealth countries is also available from the Association of Commonwealth Universities. Neutron density distribution in a nuclear reactor

- Learn the latest techniques in applied mathematics and scientific computing
- Examine case studies drawn from industrial problems
- Undertake a supervised project with an optional industrial placement
- Modules in interdisciplinary subjects and key skills
- Individualised study programme

For details, see <http://www.bath.ac.uk/math-sci/courses/msc-mam.html>

University of Birmingham

The School of Mathematics offers a twelve-month MPhil course in Mathematics and an MSc in Mathematical Finance, which is run jointly with the Department of Economics. In addition, the School offers a standard three-year PhD programme. The MPhil is an ideal preparation for entry into the PhD programme.

More details are available at <http://www.mat.bham.ac.uk/Postgraduate/mphil.htm>

Brunel University

The School of Information Systems, Computing and Mathematics offers a 1-year M.Sc course in Computational Mathematics with Modelling, which is designed to acquaint Honours graduates in Mathematics or a related discipline such as Engineering or Physics, with up-to-date numerical analysis. The course is mathematically oriented, but the use of computers is emphasized throughout. Topics covered include the numerical solution of partial differential equations with focus on the finite element method, integral equations, linear algebra, functional analysis, approximation theory, stochastic models, mathematical finance, and modelling.

Further information is available from <http://www.brunel.ac.uk/about/acad/siscm/maths/postgrad/msc>

University of Edinburgh

The School of Mathematics offers a 1-year Dip/MSc course in Operational Research. The programme has themes in: Risk, Finance and Computational Optimization. EPSRC funding is available for suitably qualified UK/EU candidates.

More details are available from <http://www.maths.ed.ac.uk/~ormsc/>

University of Greenwich

The School of Computing and Mathematical Sciences offers a one-year full time MSc Programme in Applied Mathematical Modelling and Scientific Computing. This is a completely new programme sponsored by EPSRC in the area of applied mathematical modelling with emphases on the use of computer and algorithms development. This programme intends to provide interdisciplinary background with very focused applications chosen by the students to suit their interests. EPSRC bursaries are available for suitably qualified candidates.

The programme is also offered on a two-year part-time basis and to students who may wish to enroll and start in January.

For full details see <http://cse.gre.ac.uk>

Enquiries may be sent to: Professor Choi-Hong Lai, School of Computing and Mathematical Sciences, University of Greenwich (c.h.lai@gre.ac.uk).

Heriot–Watt University

We offer taught MSc courses and PhD by research. Our Applied Mathematical Sciences MSc provides modern mathematical and numerical skills geared to careers in both research and industry. To achieve this we offer a solid theoretical and practical foundation through a broad range of modules. We have a related MSc in Applied Mathematical Sciences with Biological and Ecological Modelling which offers specialisation in the life sciences.

These MSc courses are available as a 1 year full-time MSc as well as on a part-time basis. Some EPSRC financial support is available for suitably qualified home/EU students.

Further details may be found at <http://www.ma.hw.ac.uk/mscapmasc/>

Enquiries should be addressed to: Allison Kerr (amase@ma.hw.ac.uk)

University of Liverpool

Starting in September 2007, the Department of Mathematical Sciences at the University of Liverpool is running an MSc in Mathematical Sciences that provides training in Mathematics with options of specialisations in any subjects at the project stage. Applications to the usual DTA awards are also welcome from potential candidates – for further details and other studentships, check http://www.liv.ac.uk/math/Prosp_PG/index.html

Enquiries should be addressed to: Frances Poole (Frances.Poole@liverpool.ac.uk)

University of Manchester

Starting September 2007, the Schools of Mathematics and Computer Science at the University of Manchester are jointly running an MSc in Mathematics and Computational Science that provides training in applied mathematics, numerical analysis, and computational science. It is suitable for students wishing to enter PhD programmes in mathematics, computer science, or the applied sciences. Two streams run within the MSc, depending on whether a student wishes to focus on mathematics or on computation. The programme develops many skills valued by industry and it is possible to complete an MSc dissertation with an industrial partner.

A number of bursaries are available for highly qualified students.

The course starts in September and lasts one year. It comprises lectures and coursework, with exams in January and June, followed by a dissertation that is submitted in September. The dissertation counts for one half of the credits and is chosen from a range of available projects, including projects suggested by industrial partners.

Further information is available at

<http://www.maths.manchester.ac.uk/postgraduate/pgadmission/msc-mcs.html>

Enquiries should be addressed to: Programme Director Tony Shardlow (shardlow@maths.man.ac.uk)

Admissions Officer: Len Freeman (len.freeman@manchester.ac.uk)

University of Nottingham

From September 2007 the University of Nottingham will be offering a suite of seven MSc courses in Scientific Computation:

- MSc in Scientific Computation;
- MSc in Scientific Computation with Computational Fluid Dynamics (CFD);
- MSc in Scientific Computation with Electromagnetics;
- MSc in Scientific Computation with Finance;
- MSc in Scientific Computation with Industrial Mathematics;
- MSc in Scientific Computation with Mathematical Medicine and Biology;
- MSc in Scientific Computation with Solids and Structures.

These courses offer a solid grounding in advanced scientific computation that will prepare students for either a career in business or industry, or for research in an area where computational techniques play a significant role. All seven MSc degree courses are centred around a common taught core comprising the following modules: Variational Methods, Computational Linear Algebra, and Algorithm Design and Operational Research. Optional topics can be selected from the general areas of Computational Fluid Dynamics, Electromagnetics, Finance, Industrial Mathematics, Mathematical Medicine and Biology, and Solids and Structures. In addition to the taught modules, students will undertake a three month summer project.

The courses will be taught by mathematicians, computer scientists, engineers and staff from the Nottingham Business School, fully reflecting the multidisciplinary nature of scientific computation. Further details can be found at <http://www.maths.nottingham.ac.uk>
Enquiries should be addressed to: Andrew Cliffe (andrew.cliffe@nottingham.ac.uk)

University of Oxford

Oxford University Computing Laboratory and the Mathematical Institute offer a one-year full time M.Sc. course in Mathematical Modelling and Scientific Computing. This course aims to provide training in the applications of mathematics to a wide range of problems in science and technology. It is intended for graduates in mathematics or related disciplines wishing to pursue a career in industrial or commercial research or in academia.

The course consists of both taught courses and a dissertation. Topics covered include analytical and numerical solution of ordinary and partial differential equations, numerical linear algebra, numerical optimisation, mathematical ecology and biology, fluid dynamics and mathematical physiology. The course is supported by EPSRC with 10-12 studentships being available each year.

For further details see <http://www.comlab.ox.ac.uk/oucl/courses/grad/mmsc>

Enquiries may be addressed to the Graduate Admissions Secretary, Oxford University Computing Laboratory, Wolfson Building, Parks Road, Oxford, OX1 3QD, Email: MMSA-Admissions@comlab.ox.ac.uk.

University of Plymouth

The School of Mathematics and Statistics offers one-year full-time MSc/MRes courses in Applied and Computational Mathematics. The courses provide in-depth knowledge and advanced skills that are of broad relevance for careers in a wide range of areas, including technology, finance and consulting. Students will be able to develop a critical awareness of the application of modern mathematical techniques to a variety of problems and the ability to use a range of computational tools and packages. Modules studied are chosen from - Mathematical Modelling I: Discrete and Continuous Dynamical Systems; Mathematical Modelling II: Random Systems and Systems Control; Financial Mathematics and Statistics; Nonlinear Systems; Partial Differential Equations; Personal and Professional Skills; Research Skills and Project Development; Project.

Applicants should have a good honours degree, or equivalent, in Mathematics or a numerate discipline such as Engineering.

Further information is available from www.plymouth.ac.uk or contact Dr Tom Heinzl, School of Mathematics and Statistics, University of Plymouth, Drake Circus, Plymouth, Devon, PL4 8AA, UK. Tel: +44 (0)1752 232754, Fax: +44 (0)1752 232780, e-mail: Thomas.Heinzl@plymouth.ac.uk

University of Reading

The Department of Mathematics at the University of Reading offers two one-year taught Masters postgraduate training courses, commencing on 1st October. A new MSc in the Mathematics of Scientific and Industrial Computing (formerly Numerical Solution of Differential Equations) awaiting an EPSRC Collaborative Training Award. An MSc in the Mathematical and Numerical Modelling of the Atmosphere and Oceans, run jointly with the Meteorology Department, which is fully funded by NERC. Applications are invited from candidates holding, or expecting to obtain, a minimum of a lower second class honours degree in mathematics or joint degree with mathematics, physics or engineering (with a significant mathematical content). Most qualified UK students would be eligible to receive funding of fees and stipend from the relevant research council, and most qualified EU students would be eligible for funding of fees. Both courses are available on a part-time basis over two years.

For further details see <http://www.maths.rdg.ac.uk/> or contact Sue Davis, Postgraduate Secretary, Department of Mathematics, The University of Reading, Whiteknights PO Box 220, Reading RG6 6AX, UK. Tel: 0118 378 8991, email: S.Davis@reading.ac.uk

University of Strathclyde

The Department of Mathematics offers 1-year MPhil and 3-year PhD research degrees. A PhD takes 4 years when linked to a Graduate Teaching Assistantship.

Research within the Department of Mathematics covers a wide range of applied and applicable mathematics with a prominent commitment to nonlinear mathematics and the solution of industrial problems reflecting current emphasis within EPSRC. The main research activities are grouped into four sections: Applied Analysis, Continuum Mechanics, Industrial Mathematics and Numerical Analysis.

The Numerical Analysis Group is the largest and one of the strongest in the UK. Research interests are diverse, including the construction and analysis of methods for numerical solution of nonlinear differential equations, and on computational solution of problems of practical interest. There is also related research activity in several aspects of numerical linear algebra and approximation theory.

Funding is obtained from several sources, including EPSRC, Graduate Teaching Assistantships, University Awards, Carnegie Trust, Overseas Research Student Awards Scheme, UK industry and the EU.

For further information contact Dr Oleg Davydov (oleg.davydov@strath.ac.uk)
<http://www.maths.strath.ac.uk/applying/postgraduate/>

17 Acknowledgements

I would like to thank the following people for contributing to this issue of the Newsletter.

Mark Ainsworth (Strathclyde)

Mario Arioli (RAL)

Ke Chen (Liverpool)

Sue Davis (Reading)

Shirley Day (Oxford)

David Griffiths (Dundee)

Norbert Heuer (Brunel)

Arieh Iserles (Cambridge)

Nick Higham (Manchester)

John Mason (Huddersfield)

David Sayers (NAG)

Nick Trefethen (Oxford)

Jan Van Lent (Bath)